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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/676,860 | 09/30/2003 | Norman R. Byrd | 038190/294893 | 7651 |

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| EXAMINER | |
|---|---|
| WILKINS III, HARRY D | |
| **ART UNIT** | **PAPER NUMBER** |
| 1742 | |

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/676,860 | BYRD ET AL. | |
| | Examiner | Art Unit | |
| | Harry D. Wilkins, III | 1742 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *03 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) *4 and 8* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election with traverse of group I in the reply filed on 3 March 2006 is acknowledged. The traversal is on the ground(s) that the product of claims 4 and 8 could not have been made by a non-electrolytic process as asserted in the restriction requirement because the electrolytic process produces a nanomolecular bonding layer, whereas a non-electrolytic coating process would not produce the nanomolecular bonding layer. This is not found persuasive because conclusory statements are not probative unless supported by facts. See *Ex parte Gray* 10 USPQ 2d 1922 (BPAI 1989); *In re deBlauwe* 222 USPQ 191, 196 (Fed. Cir. 1984); *In re D'Ancicco* 172 USPQ 241 (CCPA 1972); *In re Grunwell* 203 USPQ 1055 (CCPA 1979); *Meitzner v. Mindick* 193 USPQ 17; *In re Brandstandter* 179 USPQ 286, 294 (CCPA 1973); *In re Lindner* 173 USPQ 356; and, *In re Smith* 74 USPQ 207. Applicant has merely asserted that a non-electrolytic process would not provide a nanomolecular resin layer and has not provided any technical reasoning supported by factual evidence to defend this position.

The requirement is still deemed proper and is therefore made FINAL.

### *Claim Rejections - 35 USC § 112*

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which

was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The term "alkalylin specie" is not defined in the specification, and a search of US Patents, a search on www.google.com and a search on www.knovel.com produce no usage of the term beyond it appearing in claims 1 and 5 of the present application. Thus, Applicant has not enabled one of ordinary skill in the art to practice the invention.

It is the Examiner's best guess that the "alkalylin" is merely a typographical error, and Applicant's intention was to claim "alkaline" (i.e.-basic, pH greater than 7). Such assumption is based on the specification at page 11, lines 9-14 disclosing formation of a salt of the depositing compound with a basic substance. Examination on the merits will be based upon such assumption to attempt to provide Applicant with an examination of the invention. If Applicant the invention is using an alkaline solution, the claim should be amended to recite a "basic substance" (instead of "alkaline species") as that is what the specification supports.

Additionally, claim 5 recites "an aqueous solution of an inorganic compound" and then claim 6 further defines the inorganic aqueous solution as comprising phenyl boronic acid and/or polysiloxane polymer. While it is noted that polysiloxane (which would not include polydimethylsiloxane since it includes organic constituents) would be an inorganic resin, phenyl boronic acid (also known as benzeneboronic acid) is organic. Therefore, it is unclear as to what the scope of this claim is, since the scope of the claimed "inorganic compound" does not appear to be clearly defined by the specification.

Further, no discussion of the polymerization of the phenyl boronic acid or the polysiloxane polymer has been included in the specification, such absence raising a further enablement issue with claim 5. The phenyl boronic acid and the polysiloxane polymer would not operate by the same reaction mechanism as the shown discussion of radical formation for the organic reactants. Applicant has failed to provide a showing of how the phenyl boronic acid or polysiloxane polymer interact with the basic substance (the above mentioned alkalylin specie) to form a bond with the carbon fiber surface.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1 and 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 1 and 5 recite the limitation "rinsing any excess chemicals from the substrate with a rinse" in the last line of each claim. There is insufficient antecedent basis for "the substrate" in the claims. It will be assumed that the substrate is meant to be the carbon fiber. (Additionally, it is noted that claim 5 does not recite the rinsing step as step "g" as it is in claim 1.)

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sera et al (US 3,926,761) in view of Delamar et al with evidence from Byrd (US 4,405,427) (for claims 1-3) and "Applications of Carbon Fibers" (for claim 3).

Sera et al teach (see abstract, col. 4, lines 4-32 and 46-68) a method for depositing a layer of a resin on a conductive substrate including providing an aqueous solution comprising an organic compound (polybutadiene) and a basic compound (triethylamine) in a non-conducting (PVC) container, connecting the substrate to the cathodic end of a direct current source, providing a counter electrode connected to the anodic end of a direct current source and applying an electric potential to cause the ionized solution to flow to the substrate to create a layer thereon. The coated substrates were then washed with water to remove any excess chemicals from the surface.

Thus, Sera et al teach the invention substantially as claimed, with the difference between the claimed invention and the teachings of Sera et al being that Sera et al deposit the resin coating on steel plate and not a carbon fiber, nor using a graphite rod as the counter electrode.

However, Delamar et al teach (see abstract and title) depositing a polymer onto a carbon fiber by electrolytic/electrophoretic action.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted the conductive carbon fiber of Delamar et al as the substrate onto which the resin was deposited in the process of Sera et al because Delamar et al teach (see abstract) that the coated carbon fibers had improved bonding to the matrix when used in

carbon-fiber/resin-matrix composite materials, thereby enhancing the mechanical properties of the composite.

The use of graphite counter electrodes (cathodes) would have been considered an obvious variation of the process since Byrd (see col. 9, lines 3-5) suggests that the composition of the counter anode was not critical, and that a metal or conductive non-metal (i.e.-graphite) were utilized.

The deposited resinous material would have been expected to form a "nanomolecular" layer at an initial stage of treatment.

Regarding claim 2, the polybutadiene was a polymer.

Regarding claim 3, one of ordinary skill in the art would have expected the formed resin coated carbon fiber to have formed covalent bonds between the fiber and the coating as evidenced by "Applications of Carbon Fibers" section 3.2 (pages 204-205).

9. Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sera et al (US 3,926,761) in view of Delamar et al with evidence from Byrd (US 4,405,427) (for claims 5-7) and "Applications of Carbon Fibers" (for claim 7) as applied above to claim 1, and further in view of Deichert et al (US 4,341,889) with evidence from Reichenbacher et al (for claims 5-7).

The teachings of Sera et al and Delamar et al are described above.

However, Sera et al and Delamar et al do not teach using an inorganic compound as the agent to be added to the carbon fiber surface, such as a polysiloxane polymer.

It is useful to note that the chemical attachment of the polymeric chains taught by Sera et al occurs by free radical formation as is noted by Reichenbacer et al (see pages 3432-3433).

Deichert et al teach (see paragraph spanning cols. 6 and 7) that polysiloxane polymers are formed, and when the formed polymer chain is added to, the reaction occurs by free radical polymerization.

Therefore, it would have been obvious to one of ordinary skill in the art to have utilized any free radical polymerizable substance, such as the polysiloxane polymer taught by Deichert et al as the material to be added to the surface of the carbon fiber in order to form carbon fibers coated with any desired polymeric coating according to the desired end use of the fiber.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Harry D Wilkins, III
Primary Examiner
Art Unit 1742

hdw